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# Exploring jet quenching through expanding medium induced cascades

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In this exploratory study, we investigate the novel scaling features in the jet quenching parameter ($\hat{q}$) among the static and Bjorken expanding medium profiles for radiative and transverse momentum broadened parton cascades. With these scalings, firstly, we study the impact of the sensitivity of the time for the onset of the quenching Bjorken profile as well as the partonic chemistry of the jet fragments on the inclusive jet $R_{AA}$ for a purely radiative turbulent cascade. In addition, we have also studied the effect of the nPDF as well as vacuum like emissions on the jet $R_{AA}$. Next, we study the impact of the expansion of the medium on the rapidity dependence of the jet $R_{AA}$ as well as jet $v_2$ and comparing with ATLAS data. Secondly, we account for the transverse momentum broadening in the cascade to probe the angular structure for hard and soft momentum jets in expanding media. We find that subsequent splittings primarily govern the broadening in comparison to collisional energy loss, which could impact the phenomenological description of out-of-cone radiation and jet quenching in media.

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